FINAL REPORT

NASA Cooperative Agreement No. NCC 2-690

De-commutation of Experiment
Data Record (EDR) and Determination
in Engineering Units of All Appropriate
Data Contained on Tape

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SUMMARY

All of the work that was agreed to involving NASA Cooperative Agreement NCC 2-690 has been finished, and the results have been given to Alvin Seiff, PI for the Galileo Atmosphere Structure Instrument via the following:

1. A listing of a fortran program which accomplishes all objectives

2. A computer output of the results of running the program on the Galileo Cruise Checkout tape

DETAILS OF THE COMPUTER PROGRAM

The computer program is written in Fortran 77, contains about 3400 lines of code, and requires 52 pages to list. A copy of the program is included with this report, and has been previously given to all members of the Atmosphere Structure Instrument team who expressed an interest. The program accomplishes the twofold tasks of de-commutating all of the appropriate data and then converting the raw data to engineering units.

In execution, the program does the following, in the order indicated:

1. Initialize all parameters
2. Search for ASI sync words
3. Following detection of sync words, process 192 minor frames of descent data (number of minor frames before logical repetition occurs) in order to
    A. Sort data by type and time
    B. De-commutate data
    C. Store memory readout data
    D. Store housekeeping data
    E. Print out integer values and times for all data contained in 192 minor frames
    F. Repeat above process for next 192 minor frames
    G. Repeat above process until end of tape encountered
4. De-commutate memory readout data, which contains information from the calibration and entry modes
5. Print out integer values and times for all memory readout data
6. De-commutate appropriate housekeeping data, mainly various temperature measurements
7. Print out integer values and times for housekeeping data
8. Apply a variety of algorithms to obtain engineering units for pressure, temperature, and deceleration measurements

A table showing all of the measurements encountered in the descent mode and in the entry mode (from memory readout) is given on the next page. Also, the names given to the various quantities are shown. The names were chosen so the quantity in question is obvious, with "M" as the first character of all integer variables and "T" being the first character of all times. All names are limited to six characters.

APOLOGY

The author apologizes for the length of time that it took to complete this work. Two factors contributed to the delay, personal problems (including surgery) and an underestimation by more than a factor of 2 of how big a job was being undertaken.

Descent Mode Data

Measurement	# in 192 mf	Name (counts)	Name (engr units)	Time name
Pressure	372	MP	PMB	TP
Pressure ID	372	MID		TP
Temp 1	180	MT1	T1	TT1
Temp 2	180	MT2	T2	TT2
Delta V, Z1	47*,48	MDVZ1		TDVZ1
Delta V, Z2	48	MDVZ2		TDVZ2
Normal accel, min	47*,48	MANMIN		TANMIN
Normal accel, max	47*,48	MANMAX		TANMIN
Normal accel, avg	47*,48	MANAVG		TANMIN
Pressure, calib	11	MPCAL		TPCAL
Pressure ID, calib	11	MIDC		TPCAL
Temp 1, calib	11*,12	MT1CAL		TT1CAL
Temp 2, calib	12	MT2CAL		TT2CAL
Temp, AX sensor	12	MXTEMP		TXTEMP
Temp, AY sensor	12	MYTEMP		TYTEMP
Temp, AZ1 sensor	12	MZ1TEM		TZ1TEM
Temp, AZ2 sensor	12	MZ2TEM		TZ2TEM
Temp, P sensor	12	MPTEMP		TPTEMP
Temp, ASI elec	12	MASITM		TASITM
Sci temp offset	11	MTOFF		TTOFF
AN ranges	12	MANRNG		
Z ranges	12	MZRNG		
PEC words	12	MPEC		
Axial turb (1-8)	7*,8	MAXT1,etc		TAXT
Lateral turb (1-8)	7*,8	MLAT1,etc		TLAT
A/D 1, calib	3	MAD1C		TAD1C
A/D 2, calib	3	MAD2C		TAD2C
A/D 1, offset	3	MAD1OF		TAD1OF
A/D 2, offset	3	MAD2OF		TAD2OF

Entry data from memory readout in descent mode

Z1 acceleration	MZ1	AZ1G	TZ1
Z2 acceleration	MZ2	AZ2G	TZ2
Normal acceleration	MAN	ANG	TANN
Ranges & status	MRNG		
Temp, AX sensor	MXT		TXT
Temp, AY sensor	MYT		TYT
Temp, AZ1 sensor	MZ1T		TZ1T
Temp, AZ2 sensor	MZ2T		TZ2T
Temp, ASI elec	MASIT		TASIT
Pressure near AZ pk	MPAZPK		
Accel near AZ pk	MAZPK		

* denotes first time through descent mode